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Promising Fields in Statistical Domain.¹

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Statistics is a domain which only in relatively recent times has been conquered by science and, like all new domains, is cultivated with essentially different intensity in its various fields. This is especially true for statistical methods. For some time statistical methodology has been, we may say, a kind of colony of the mathematical sciences. The fields which were settled the first, present even now by far the greatest development; this is the case for the theories of averages, frequency distributions, and correlation. Only in relatively recent times statistics has begun to be treated as an independent discipline having its own aims and the task to adapt to these aims its methods. New fields have been consequently opened to the treatment of statistical methods, such as concentration, transvariation, elimination, cograduation. To what degree we may say that the wealth or income of a country is more concentrated than that of another country?² What is the probability with which we may forecast that an individual of a group possesses a certain character in a higher degree than the individual of another group, when we know only that the average character in the first group is higher than the average character of the second group?³ What are the best methods for eliminating the influence that some factors have upon certain characters and isolating the factors whose influence we want to measure and compare?⁴ What are the relations between the lower, median and higher degrees of a character in a group of individuals and the lower, median and higher degrees of the same character in another group of individuals, relations which permit us to pass from the curve of distribution of the first group to the curve of distribution of

the second, for example from the curve of distribution of incomes to that of fortunes, or from the curve of distribution of the statures of a population to that of weights?⁵ What are the appropriate methods for the statistical treatment of qualitative characters?⁶

These and many others are problems only recently approached systematically by statisticians and in which new researches will probably achieve new results and developments and perhaps originate new chapters in statistical methodology.

Not less important than the opening of new fields is the different spirit with which all the fields, ancient and new, are cultivated. As a matter of fact the formalistic conception of statistical methodology, which was the natural consequence of the mathematical origin of its first chapters, is losing ground. The statisticians are insisting more and more upon the necessity that statistics be not treated as mathematics, more over than it be not treated with mathematics without discrimination, but that it must be treated with the simplest means possible to adopt in order to attain the purposes of the researches, making recourse to mathematics only in as much as it is necessary and in any case in the simplest form.⁷

The new chapters and the new spirit of investigation will lead—I am sure,—in a short time to a complete and organic system of statistical methods giving to statistics the dignity of an independent science.

But in my opinion it is not in the theoretical fields that we may expect in the near future the most important progress of statistics.⁸

Collection, tabulation and publication of data from the official bureaus have as a matter of fact progressed until now more slowly and less independently than the theoretical methods.

It is necessary to remember in this connection that the collection of statistical data has originated not from scientific needs but from practical convenience. Statistics has been

in the past the slave of Administration and also at present in all countries is very far from having a suitable degree of independence. The consequence is that the statistical data, in their accuracy, in their periodicity, in their classification, in their combinations, do not yet satisfy the scientific requirements. Moreover in many states they are not yet coordinated to a common administrative purpose by the different departments, all of which have in view their special needs and aims.

The centralization of statistics is the first step towards their rational organization. Statistical services are in such a manner released from the narrow point of view of the single departments and coordinated mutually towards the general aim of illuminating the policy of the government according to an organic program.

This step however has been made until now, only in a relatively small number of countries; its adoption by the other countries, adoption towards which there is a clear tendency, will represent an essential progress in statistical organization.

The centralization of statistical services will also facilitate in a certain degree the scientific treatment of their data. After recognizing statistics as an independent service of information for the immediate action of the government, it is but natural to consider, in a later stage, also its utility for the wider objects of science.

The coordinating action of the International Institute of Statistics and of other international bodies interested in the uniformity of governmental statistics will be substantially facilitated by the said centralization, and, as a matter of fact, only in recent years it may be said that the proposals, recommendations and resolutions of these bodies have received some practical applications.

The centralization of statistics means however in almost all the nations only the centralization of the services of

tabulation and publication of statistical data, while their collection is, with only one exception, entrusted to the organs of the other administrations. There is here a special difficulty for the statistical services as compared to all other public services.

As a matter of fact the statistical services are for this reason in a certain measure at the mercy of the other administrations, which for financial considerations or for scarcity of personnel may cause difficulties or delays in the collection of data. On the other hand the different system, which is adopted by the Soviet Republics, presents also its drawbacks. In the Soviet Republics the central administration of statistics has at its dependency a special staff of correspondents (about 100 thousand including voluntary assistants) which has the task of collecting and checking the data at the circumference. The drawbacks of this system depend in the first place on its high cost and in the second place on the difficulty of finding so numerous a staff of correspondents having the necessary competence and the not less necessary knowledge of the organisation of the different administrations. Perhaps the solution may be found in an intermediate system according to which the data would be collected and checked by the different administrations through special employees who would receive from the central bureau of statistics a special compensation for their work.⁹ The task of supervising the statistical services of other administrations may be also entrusted to the central bureau of statistics, a supervision which is already adopted in Italy with remarkable results.¹⁰

The centralisation of the services of statistics and the consequent emphasizing of the governmental and scientific importance of statistics will certainly increase the importance of the central statistical bureaus and extend the field of their researches in comparison with the individual scientific inquiries.

We may then expect that in the future such statistical researches which need a very wide field and are favoured by

the compulsory collection of data, such as family budgets, inquiries on production, anthropometric investigations will receive special attention from the central bureaus of statistics. These are destined to become in my opinion more and more the center of the scientific progress of statistics. It will be useful in connection with this feature to institute in them special research services as is the case in the central bureau of Italy, where a mathematical and chartographical service and a bureau of researches are functioning under the direction of specialists.

A difficult but extremely important task will be reserved in the future to the central statistical offices which will have to satisfy the increasing need of governments for forecasting the future development of the demographic and economic conditions of the nation. The forecasting of the future development of populations which has spread a great deal in recent times is only one of the manifestations in this direction.¹¹ Another manifestation is the tendency of the central statistical offices to enter into close connection with the institutions for measuring the economic situation and making forecasts for their future development.¹² I have had already the opportunity to express the thought that at the root of the present world wide crisis, there is a lack of adaptation between the production and the immediate needs of the present generation, depending upon a progressive change in the psychology of the leaders of production. They work more and more not so much in order to assure the satisfaction to their material needs, but also, if not principally, in order to satisfy a psychological need of working.¹³ If I am right in thinking that this condition of things is not a transitory one, a great task will be entrusted to the State in order to direct the resulting excess of production towards the satisfaction of the needs of future generations. The statistical bureaus will certainly have in that case an extremely important function in giving to the governments the essential elements for such a direction. Apart from such

a possibility we see that the most prominent political personalities are already well acquainted with the importance that the statistical services have in furnishing to the government the data for its future policy. Your Prime Minister has very rightly pointed out that governing is forecasting¹⁴ and our Prime Minister Signor Mussolini has stated that a man who would not be able to look into the future fifty years ahead is not deserving of governing a great nation.¹⁵ It is not a mere chance that these prominent men are also very great supporters and promoters of the development of national statistics. Under the protection of our Prime Minister we have reconstructed in recent years the Italian statistical services and given them again, if I am not mistaken, a leading place such as they had in the past. Under your present government your statistics also is rapidly progressing and it has been a very agreeable task for me, as President of the first section of the recent meeting, to congratulate very heartily your countrymen on their numerous and valuable contributions to our sessions.¹⁶

One of the most promising points in the future of statistics will certainly be the closer coordination between the statistical bureaus of Western and North American countries, on one side, and those of the Eastern countries and Latin America, on the other.

The recent meeting at Tokyo and the proposal for holding a next meeting in Mexico¹⁷ are expressions of the need of coordination felt by the latter countries and fully shared by the former.

This cooperation will be of paramount importance, not only for official statistics, but also for scientific researches. In saying this I am thinking more especially of the problems of population.¹⁸ I have had already occasion to point out that the western theories of population have, in the past, developed having in view principally, if not exclusively, the conditions of white populations in recent times, for which we

possess statistical data. But this is only a fragment of the whole demographical evolution, which it is necessary to take into consideration in order to build up a complete theory on population.¹⁹ The more and more active part taken by the Far East and by Latin America in world statistical collaboration will certainly furnish to western scholars a mass of precious and for them mostly unknown material, for checking and revising their theories.

Not only has this meeting in Japan been then a welcome opportunity to meet our Eastern colleges and to become directly acquainted with these countries which have plaid, play and will play so great a part in the history of civilization, but it has been in my opinion also the seed from which a more wide and intimate collaboration will develop between the statisticians and sociologists of all the parts of the world.

It is a pleasure for me to conclude my lecture with the hope that this seed may give in the near future all its promising fruits.

1) Lecture given at the Imperial University of Kyoto, September 22, 1930.

2) Cp. in this field: M. O. Lorenz: *Methods of measuring the concentration of wealth*, "Publ. of the Am. Stat. Ass." Vol. IX, 1905. C. Gini: *Il diverso accrescimento delle classi sociali e la concentrazione della ricchezza*, "Giornale degli Economisti." 1909; *Indici di concentrazione e di dipendenza*, "Biblioteca dell'Economista" 5^a Serie, Vol. 20°, 1910; *Sulla misura della concentrazione e della variabilità dei caratteri*, "Atti del R. Ist. di Venezia di Scienze, Lettere ed Arti" T. LXXVII, 1913-1914; *Memorie di Statistica metodologica*, under press. Metron's Library, Rome; *Intorno alle curve di contrazione*, "Metron" Vol. IX. 1930. L. Amoroso: *Ricerche intorno alla curva dei redditi*, "Annali di matematica pura ed applicata" 1925. E. T. Gumbel: *Ein Mass der Konzentration bei pekuniären Verteilungen*, "Archiv für Socialwissenschaft und Socialpolitik" Bd. 58, H. I, 1927. *Das Konzentrationsmass*, "Allgemeines Statistisches Archiv" Bd. 18, H. 2, 1928.

3) Cp. C. Gini: *Il concetto di transvariazione e le sue prime applicazioni*, "Giornale degli Economisti e Rivista di Statistica" 1916. M. Boldrini. *Biometrica*, Padua, 1928.

4) This subject is fully treated in our article: *Quelques considérations au sujet des nombres indices et des questions analogues*, "Metron" Vol. IV, 1924. For the preceding researches in this field, cp. the works there quoted:

Ogle, Körösy and Westergaard deserve special mention.

5) Cp. C. Gini: *Delle relazioni tra le intensità cograduate di due caratteri*, "Atti R. Istituto di Venezia di Scienze, Lettere ed Arti" T. LXXVI, p. II, 1916-1917.

6) For the treatment of qualitative characters cp.: C. Gini: *Variabilità e mutabilità*. Parte II. *Indici di mutabilità*, to be reproduced in the work under press: *Memorie di Statistica Metodologica*, and C. Gini and L. Galvani: *Di talune estensioni dei concetti di media ai caratteri qualitativi*, "Metron" Vol. VIII, 1929. The problem is quite different for the characters which are quantitative, but not measurable. Cp. for these characters, K. Pearson: *On the correlation of characters not quantitatively measurable*, "Phil. Trans. of the Roy. Society of London", Serie A. CXCX.

7) Cp. C. Gini: *The contribution of Italy to Modern Statistical Methods*. "Journal of Royal Statistical Society" July 1926.

8) Cp. C. Gini: *Present condition and future progress of Statistics*. "Journal of the American Statistical Association" September, 1930.

9) This question is examined in my presidential address of Dec. 7, 1929 to the Superior Council of Statistics of the Kingdom of Italy, "Annali di Statistica" Serie VI, Vol. VII, 1930.

10) The organisation of the statistical services in Italy has been explained several times. See the speeches of Prof. Corrado Gini at the inauguration of the Central Statistical Institute (July 14, 1926), at the first meeting of the Superior Statistical Council (December 20, 1926) and at the successive meeting of this Council (July 15, 1927), in "Annali di Statistica" Serie VI, Vol. VII, 1929. See also his report to the Superior Statistical Council (December 7, 1929) in "Annali di Statistica" Serie VI, Vol. VII, 1930, and the articles: *La ricostruzione della Statistica Italiana* in "Gerarchia" March 1928; *L'Istituto Centrale di Statistica ed i suoi compiti*; in the volume *Lo Stato Mussoliniano e le realizzazioni del Fascismo della Nazione*, "Rassegna Italiana" Rome, 1930. The law and regulations concerning the Central Institute of Statistics of Italy are published in the "Annali di Statistica" Serie VI, Vol. I, 1930. Several states have imitated the Italian statistical organisation (Hungary, Mexico, Portugal) and others have asked informations in order to study and imitate it (Belgium, Bulgaria, Yugoslavia).

11) See the publications made on this subject by the Central Statistical Offices (or their functionaries) of Germany, France and Italy. Cp.: *Richtlinien zur Beurteilung des Bevölkerungsproblems Deutschlands für die nächsten 50 Jahren*, "Die Bewegung der Bevölkerung" 1922-1923, Bd. 316, 1926; A. Sauvy, *La population française jusqu'en 1956*, "Journal de la Société Statistique de Paris" 1928-1929; *Calcolo di previsione della popolazione italiana dal 1921 al 1961*, "Annali di Statistica" Serie VI, Vol. X. For several other countries (Great Britain, United States of America, Ucraina, Denmark), the forecastings have been made by private scholars.

12) Some Central Bureaus of Statistics are intimately related with the Barometers Bureaus of Index Numbers Services of their countries. This is the case in U.R.R.S., Germany, Hungary. In the majority of the countries, however, the Barometers Bureaus or Index Numbers Services are private organisations quite independent from the Official Bureaus. This is also the case for Italy.

13) Cp. our article on the world crisis. "Information" Sept. 4, 1930.

14) In the address given at the dinner offered to the members of the Congress, Monday, September 15.

15) Cp. the preface to the Italian translation of the book of R. Korherr: *Regresso delle nascite: morte dei popoli*, Rome, 1928, pag. 11.

16) In the report presented to the General Assembly, as President of the first section of the Congress.

17) The next ordinary meeting of the Institute will be held in Madrid in September, 1931. The proposal has been made to hold the following meeting of 1932 in Mexico.

18) A World-Union is established for the scientific study of the problems of population. Cp. the report presented at the Cairo meeting of the International Institute of Statistics *Le Comité Italien pour l'étude des problèmes de la population*. "Bulletin de l'Institut International de Statistique" T. XXIII, 1ère Livr. 1928.

19) Cp. the article *The future of human populations*, "American Journal of Sociology" Sept. 1930.